tures with the same concentrations in soil solutions.

3. "The toxicity of soluble salts in the soil was found to be in the following order: sodium chlorid, calcium chlorid, potassium chlorid, sodium nitrate, magnesium chlorid, potassium nitrate, magnesium nitrate, sodium carbonate, potassium carbonate, sodium sulfate, potassium sulfate, and magnesium sulfate."

Since the author did not determine and did not know how much of these salts were actually in the soil solution he could not very well indicate their relative toxicities. It will be noted that sodium carbonate is placed near the bottom of the list as a relatively harmless salt, whereas, as a matter of fact, it is one of the most toxic salts occurring in the alkali soils of the west.

4. "Land containing more than the following percentages of soluble salts are probably not suited without reclamation to produce ordinary crops: In loam, chlorids 0.3 per cent.; nitrates, 0.4 per cent.; carbonates, 0.5 per cent.; sulfates, above 1.0 per cent. In coarse sands, chlorids, 0.2 per cent.; nitrates, 0.3 per cent; carbonates, 0.3 per cent. and sulfates, 0.6 per cent."

Here again the author draws conclusions without having accurate data on which to base them. If the above percentages were to be adopted by chemists in determining the suitability of alkali soils in the field for crop growth, the results would be misleading in the extreme. The results are not in accord with those obtained by determining toxic limits in field studies, nor with laboratory experiments in which toxicity is related to the alkali actually in the soil solution instead of to that which was put in.

In the paper by Harris and Pittman, published in November, 1918, the authors have adopted the same erroneous method but they are more careful in drawing conclusions as the absorption of the salts added is apparently recognized but is not determined and related to crop growth. The conclusion, however, that "Loam soils and soils with a high water-holding capacity may be successfully farmed at a higher alkali content than others" may possibly be true but there is no data given in the paper which justifies the conclusion, for the per cent, of alkali salts recoverable from the two kinds of soil was not correlated with crop growth.

It is also suggested that the results obtained by Brown and Hitchcock published under the title "The effects of alkali salts on nitrification" (*Soil Science,* Vol. IV., No. 3) and by Singh on the "Toxicity of alkali salts" (*Soil Science,* Vol. IV., No. 6) would have been more valuable had they been correlated with the recoverable salts rather than with the salts added to the soils with which they were working.

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ON HIGH-ALTITUDE RESEARCH

I AM beginning to appreciate the difficulty of making one's self understood in a statement where matters are suggested rather than explained in detail, and where a critical attitude is urged until a result is actually verified by experiment, even when one feels perfectly confident beforehand what the result will be. The present statement is written for the purpose of correcting any misconceptions that may have arisen from my recent press statement.

First, the time necessary for a preliminary exploration of the atmosphere will be required chiefly for the preparation. It is not like an exploration of "darkest Africa," for, with the proper rocket apparatus and instruments, each flight will occupy but a short time; and not many will be needed to obtain a very considerable amount of information, such as an accurate knowledge of densities, that would be needed for any further developments.

The expense also will be chiefly that for preparation; namely, for machine construction and tests. A final form of apparatus, designed for reaching any particular altitude, should not be expensive. This is, of course, true of any product that requires machine development.

Incidentally, the object of these experiments is by no means restricted to the taking of photographs in the earth's atmosphere, although this application may have more uses than were at first suspected.

Regarding the ultimate developments of the method, I do not wish to leave the impression that these will be restricted to researches in or near the earth's atmosphere. On the contrary, every one of the matters so far proposed is, as I have already maintained, based upon sound physical principles, and can therefore be realized. Further, there are additional principles, the application of which is certain to lead to results of even greater interest and importance. All these results will be realized, however, not by argument and discussion, but by the application of real research methods to the problems that are waiting to be solved.

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SCIENTIFIC BOOKS

Studies on the Variation, Distribution, and Evolution of the Genus Partula. The Species Inhabiting Tahiti. By Henry Edward Crampton. 313 pp., 34 plates, 252 tables, 7 text figures. Publication No. 228 of the Carnegie Institution of Washington, January, 1917.

Interest having been diverted from pure science by the war, no adequate review has appeared of this monumental and fundamentally important work which represents the results of four journeys of exploration made by its author in Polynesia; in the course of which more than 75,000 adult snails were collected together with over 7,000 adolescent individuals; more than 200 of the valleys of the Society Islands having been visited for this purpose.

The present volume deals with snails from Tahiti alone, and the thorough, scholarly, and conservative treatment given the subject renders this work of paramount value to all future students of the variations of *Partula*.

Not alone were variations and distribution of the adult snails studied, but the young contained in the brood pouches of the adults were dissected out, thus throwing light upon the fecundity of each variety, and the ratio of elimination of the young before they can reach maturity.

Crampton shows that these snails are not found in the dry low-lands along the shore, nor do they occur in the cold regions of the high peaks of the interior, for a temperature of 55°–60° F., stops their activity. The snails are therefore restricted to the relatively moist deeply wooded troughs of the intermediate regions of the valleys where they are commonly found during the day-time on the undersides of the leaves of the banana, wild plantain, caladium, turmeric, wild ginger and dracæna.

The ridges between valleys are generally dry, and thus the snail population of each valley is more or less isolated. Crampton finds that these snails descend from the trees and bushes and feed during the night, or on moist days, upon decaying vegetation. The young and adolescent being more active in this feeding reaction than are the adults.

It has long been known from Garrett's studies that the Tahitian species of *Partula* like the *Achatinella* of Oahu varied from valley to valley, some forms ranging over a wide area while others are restricted to a single valley, or even to a limited region within a valley.

In general moreover the farther apart two valleys the wider the diversity between their snails, although this is not always the case. Crampton's work has the merit of giving precision to our hitherto more or less vague knowledge of the distribution of the 8 species of *Partula* found in Tahiti. He shows conclusively that great changes have occurred since Garrett studied the snails, in 1861–1884, and that in some cases the species have spread over wider areas, and in the interval have produced some new sub-species or varieties. Thus the fascinating picture of a race in active process of evolution is presented. The details of this process are rendered clear by the excellent photographs of relief maps, and